

Lower San Rafael Bridge
County Road 1010
Spanning the San Rafael River
22 miles South of Green River
Emery County
Utah

HAER No. UT-89

HAER

UTAH

8-GREER-V,

1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain System Support Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD
LOWER SAN RAFAEL BRIDGE

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I. INTRODUCTION

Location: Spanning the San Rafael River on County Road 1010, Emery County, Utah

Quad: Horse Bench East, Utah 7.5 min scale

UTM: 12/574500mE 4290040mN

Date of Construction: 1940s, erection at present location 1973

Present Owner: Emery County
County Seat, Castle Dale, Utah

Present Use: Vehicular and pedestrian bridge to be replaced by a new vehicular and pedestrian bridge. Projected date of removal is November 1996.

Significance: The Lower San Rafael Bridge is a World War II Bailey bridge.

Historians: Lorna Billat and Jenni Prince-Mahoney, JBR Environmental Consultants, Inc., June 1996

II. HISTORY

A. NEED FOR THE BRIDGE

Castle Valley is nestled below the Wasatch Range in east central Utah. The area was settled by Mormon pioneers in the late 1870s and in 1880 became Emery County.¹ In the 1880 census, eight types of occupations were represented in Emery County: farmers (81%), ranchers (13%), a herder, a harnessmaker, a stonemason, a carpenter, a blacksmith, and a lawyer.² The community was based solely on agriculture. By 1900 the occupational make-up of the community had greatly expanded with the census listing 61 types of occupations. Agriculture comprised 58% of the occupations at this time.³

The shift from agriculture to mining in the northern portion of Castle Valley was well on its way by 1894. The northern part of Castle Valley petitioned to split from Emery County and in 1894 became Carbon County, named for its mining future.⁴ Castle Valley has the richest, most important coal fields in the state which furnish 98% of Utah's output.⁵

The town of Green River is on the east side of Emery County and about 22 miles north of the lower San Rafael River bridge. The town was settled in 1878 and originally called Blake but in 1884 was renamed Green River in honor of the river nearby. In 1895, the town was renamed Greenriver, as one word, to distinguish it from Green River, Wyoming.⁶ Later the name was changed back to two words. The community was based on agriculture and the land was irrigated by water wheels. In 1880, 17 citizens organized the Blake City Water Ditch Company which

consisted of an unincorporated agreement to furnish work and support the water project.⁷ Most of the economic activity at this time was in livestock since range was good and little farming was needed to raise feed.⁸

The Denver and Rio Grande Western Railroad came through the area in 1883. The mail was delivered by rail putting Emery County in direct contact with the world.⁹ The railroad made possible the distribution of coal and agricultural goods outside the communities while supplying goods not easily accessible in the county. The railroad brought in many people and Green River became one of the wildest boom towns in Utah with fights, killings, prostitution, and outlaws.¹⁰ Many railroad people lived in Green River until 1930 when the division was moved to Helper.¹¹

Around 1906 with an influx of new people and industry, Green River became more of a respectable town. Some of the more prominent businesses over the years have included the Green River Meat Market, Underhill Drug Store, T.W. McCarty Saloon and Pool Hall, Fletcher - Dealers in Coal, Hay, and Grain, Merrill Bollinger Lumber Company, McCarty and Pace General Merchandise, and the Green River Bakery.¹²

Natural resources in Emery County have been investigated over the years. As early as 1899, attempts have been made to discover oil. Companies such as the California-Utah Oil Company (1899), the Des Moines Oil Company (1912 and 1914), and the Phillips Petroleum Company (1928) were early pioneers in the hunt for Emery County oil. There has been little success in discovering lucrative oil sources. Mining has been of great importance to the county with coal being the most profitable. Very little mining for gold has occurred. Uranium was discovered in 1909 on the

mesa northwest of the San Rafael bridge and at Temple Mountain in 1910 and vigorously mined.¹³

The San Rafael Swell located in part in Emery County contains oil, carnotite, uranium, and gypsum.¹⁴ Although these resources have not been exploited in the Swell yet, access to this area has tapped into a new resource: tourism. The county possesses unusual geologic attractions such as strangely colored and patterned deserts in the east and south.¹⁵ This interest in the geologic wonders of Emery County as an economic resource was noted as far back as 1941 in the Inventory of County Archives, No. 8: Emery County. Some of these areas are accessed by County Road 1010 which crosses the San Rafael River on the lower San Rafael River bridge.

Emery County economics and lifestyle have not changed much over the years. The economy is still mainly agricultural with a great deal of coal mining. Tourism has become quite profitable as well. In 1950, L.T. Hunter appeared before the board of Commissioners of Emery County with a petition that scenic attractions of the southeastern part of the county be made accessible to tourists and that county equipment be utilized in making roads accessible to those areas on the San Rafael River.¹⁶ In 1951, it was brought to the attention of the Commission that "the lower San Rafael bridge was in need of repair".¹⁷ The demise of the original lower San Rafael bridge is unclear, but in the spring of 1973, a World War II Bailey Bridge was installed across the river one quarter mile upstream from the original location. The county road was moved to access this new bridge also.

In the early days of World War II, British engineers were faced with the problem of bridging that was inadequate for their new armored and mechanized equipment. Modifications of existing material met some bridging requirements, but new equipment was clearly needed. Mr. Donald Coleman Bailey, chief engineer of the British Experimental Bridging Establishment, offered a solution to this problem by proposing a bridge design based on panel trusses.¹⁸ Bailey's design met the criteria in terms of manpower requirements, transportation needs, flexibility of design, and flexibility in loadbearing capacity. Field tests of the Bailey under various conditions confirmed the value of its design and its potential for use in many tactical situations. The Bailey could be used as a semi-permanent fixed bridge, spanning dry gaps or small streams, and it could be used with pneumatic floats or pontoons across wide water bodies. Early use of the bridge by combat engineers in battle reconfirmed the results of field trials. Throughout the war, Bailey's were used in many configurations, from floating bridges to suspension bridges. The only negative aspect of the bridge was in difficulties of production and manufacture interchangeability. However, the operational value of the Bailey far outweighed the problems. In Sicily and Italy, the Bailey was often the bridge of choice. In northern Europe, the Bailey complemented the tactical float bridges and assault bridges, especially for armored forces. The Bailey was also used in the Pacific and in China.¹⁹ It could be constructed as a quick temporary bridge for troop and equipment transport until more permanent bridges could be erected. The panels and a crane were moved to the location of the bridge where the crane was then used to unload and lift the panels into position.²⁰

The bridge design as a military product of World War II was conceived to be highly mobile, adaptable to various size crossings, and to support heavy loads. This made it an ideal bridge for the county to use at its present location. It was designed to be a temporary structure, since it only accommodates one lane of traffic, although Emery County has chosen to leave it in place for more than twenty years.

B. CONSTRUCTION CHRONOLOGY

The first organized road building crew in the county was supervised by Selectman Orange Seeley, Sr.²¹ In the year 1888, Emery County obtained aid from the territory and bridges were then constructed on the Cottonwood, Price, and Huntington streams.²²

In 1909 the town of Green River sent a petition to the legislature asking for a wagon bridge.²³ In the fall of 1910, a wagon bridge was begun and construction completed in the following spring. It is not stated where this bridge crossed the river or whether it crossed the Green River or the San Rafael River.

In the early years, territorial and county roads were financed through poll taxes and tolls. At the time it was instituted, poll taxes required one day of labor or \$1.50 per year from all able-bodied males of a certain age. In 1862, the poll tax law in Utah was changed to two days labor per year or \$1.50 per day in lieu of that.²⁴ Tolls were instituted to pay for maintenance on wagon roads and to keep the necessary structures over streams passable. In 1914, in Emery County, poll taxes required every man age 21 years to 50 years to pay \$200.00 or they could choose to

work out the tax by using their teams or equipment to improve roads.²⁵ Knowlton acknowledged "this type of financing {was} very satisfactory for short sections of highway which involve primarily bridges, tunnels, or ferries".²⁶

Railroad transportation was available in the area in 1883 when the Denver and Rio Grande Western Railroad was constructed through the valley. This cut down on the need for road maintenance between many towns. As a result of the increased utilization of the railroad system, the funding provided by the state for inter-community roads was greatly reduced. Therefore, rural community road maintenance became strictly a county and/or city concern²⁷.

The State Road Commission was created in 1909. At that time, Emery County roads were maintained mostly by the county. Only two small segments of state road were present in Emery County by 1910.²⁸

The economy of Emery County began and continues to be based on agriculture and coal mining. In an inventory of the county archives in 1941,²⁹ it was stated that in a 1920 census the entire population was classified as rural. About 30% of the population was involved in farming/stock-raising and the other 70% were mostly involved in the coal mining business. Rural roads are an integral part of the agricultural and coal mining community providing links between the farm fields, settlements, coal mines, and distribution lines.

One of the UDOT structure inventories indicated the Lower San Rafael bridge was constructed in 1950. Most likely, this was not possible because

in 1950 all Class "B" projects (road maintenance) were terminated for the year due to lack of funds.³⁰ Another UDOT structure inventory states that the bridge was installed in 1970. According to a personal informant from the Roads Commission, the bridge was installed in the spring of 1973.³¹

As far back as 1951, there are indications of problems with the original lower San Rafael bridge³² and that it needed repair. Numerous culverts had to be built in order to prevent damage to the bridge.³³ In the early 1970s, the bridge was replaced with a World War II Bailey bridge brought from another location on the San Juan River near Bluff.³⁴

C. LOCATION

The bridge is located 22 miles south of the town of Green River in Emery County, Utah. The bridge spans the lower San Rafael River along County Road No.1010, approximately two miles west from where it flows into the Green River. The bridge provides access to the southeastern corner of Emery County. The area has been used for stock-grazing and more recently for tourism and recreation.

III. THE BRIDGE

A. DESCRIPTION

The bridge is a military Bailey bridge. It was developed during World War II for quick and easy erection and transportation. The county acquired the bridge as surplus from the U.S. Government.³⁵ The Bailey bridge consists of a beam and truss lattice framework superstructure, while

the substructure consists of a series of lateral "I" beams overlain with smaller longitudinal "I" beams. The deck is constructed of rough cut lumber and overlain with six wood planks positioned for single lane traffic.³⁶ The bridge sits on concrete abutments that overlie two sets of three steel cylinders driven into the river bed and filled with concrete. Although constructed in prefabricated 10 foot segments the bridge has a total single span of 96 feet and is 11 feet 3 inches wide. The bridge was erected at the present location in the spring of 1973.³⁷ It was bought from the Utah State Department in Bluff, Utah where it had also been used to span the San Juan River. It was disassembled into 10 foot sections, transported to the present location, reassembled, and pushed across the river on rollers. According to one source, several parts were missing (rollers and clamps) and had to be fabricated. Five men constructed and assembled the bridge.³⁸

The Bailey Bridge was erected to replace an older wood timber bridge. The original bridge was located one quarter mile downstream from the present location. It was old and decayed and considered hazardous. The edges of the old bridge were removed so that it couldn't be crossed but it was left in place.³⁹ Remnants may still be present. The county road was also relocated when the new bridge was installed.

B. MODIFICATIONS

No modifications have been conducted on the Bailey Bridge. Maintenance in the form of painting and sandblasting have occurred.

C. OWNERSHIP AND FUTURE

The Bailey Bridge was originally owned by the United States government and fabricated during World War II. It was bought by the Utah State Department in a surplus sale. The bridge was initially used to span the San Juan River near Bluff, Utah. It was then bought by Emery County in the early 1970s. The lower San Rafael Bridge was erected, owned, and continues to be maintained by the County of Emery. Recent study of the bridge indicated limitations in handling projected traffic volumes and loads in the years ahead. It was deemed necessary to replace the bridge in order to handle forthcoming use. There are plans to utilize the mobile Bailey Bridge at another location.⁴⁰

IV. FOOTNOTES

1. Powell, Allan K., Emery County: Reflections on Its Past and Future, p. vi.
2. Powell, Allan K., Emery County: Reflections on Its Past and Future, p. 5.
3. Powell, Allan K., Emery County: Reflections on Its Past and Future, p. 5.
4. Powell, Allan K., Emery County: Reflections on Its Past and Future, p. 11.
5. McElprang, Stella, Castle Valley: A History of Emery County, p. 11.
6. McElprang, Stella, Castle Valley: A History of Emery County, p. 183.
7. McElprang, Stella, Castle Valley: A History of Emery County, p. 183.
8. McElprang, Stella, Castle Valley: A History of Emery County, p. 185.
9. Inventory of the County Archives of Utah, No. 8 Emery County, p. 23.
10. McElprang, Stella, Castle Valley: A History of Emery County, p. 186.
11. McElprang, Stella, Castle Valley: A History of Emery County, p. 187.
12. McElprang, Stella, Castle Valley: A History of Emery County, p. 192.
13. McElprang, Stella, Castle Valley: A History of Emery County, p. 190.
14. Inventory of the County Archives of Utah, No. 8 Emery County, p. 32.
15. Inventory of the County Archives of Utah, No. 8 Emery County, p. 32.
16. Minutes Book E, November 8, 1950, p. 430.
17. Minutes Book E, July 25, 1951, p. 465.
18. Roberts, Larry, Engineer.
19. Robert Yourston, personal communication, July 1996.
20. Department of the Army, A Pictorial Review of Engineer Work Performed by Engineer Troops of XXIV Corps During the Okinawan Campaign, no page numbers.

21. McElprang, Stella, Castle Valley: A History of Emery County, p. 19.
22. McElprang, Stella, Castle Valley: A History of Emery County, p. 19.
23. McElprang, Stella, Castle Valley: A History of Emery County, p.193.
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26. Knowlton, Ezra C., History of Highway Development in Utah, p. 23.
27. Knowlton, Ezra C., History of Highway Development in Utah, p. 78.
28. Knowlton, Ezra C., History of Highway Development in Utah, p. 146-7.
29. Inventory of the County Archives of Utah, No. 8 Emery County, p. 34.
30. Minutes Book E, 10-18-50, p. 427.
31. Jensen, Michael, personal communication, May 1996.
32. Emery County Minutes Book E, 7-25-51, p. 465.
33. Emery County Minutes Book E, 3-16-50, p. 413.
34. Jensen, Michael, personal communication, May 1996.
35. Johansen, Craig, Programmatic Section 4 (f) Evaluation, p. 2.
36. Johansen, Craig, Programmatic Section 4 (f) Evaluation, p. 2.
37. Jensen, Michael, personal communication, May 1996.
38. Jensen, Michael, personal communication, May 1996
39. Jensen, Michael, personal communication, May 1996.
40. Johansen, Craig, Programmatic Section 4(f) Evaluation, p. 2.

V. BIBLIOGRAPHY

A. BOOKS

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Utah State Historical Society, Inventory of the County Archives of Utah No. 8 Emery County (Castle Dale). Ogden, Utah, March 1941.

B. PERIODICALS

Roberts, Larry, "The Bailey Bridge" in Engineer, 1990.

C. INTERVIEWS

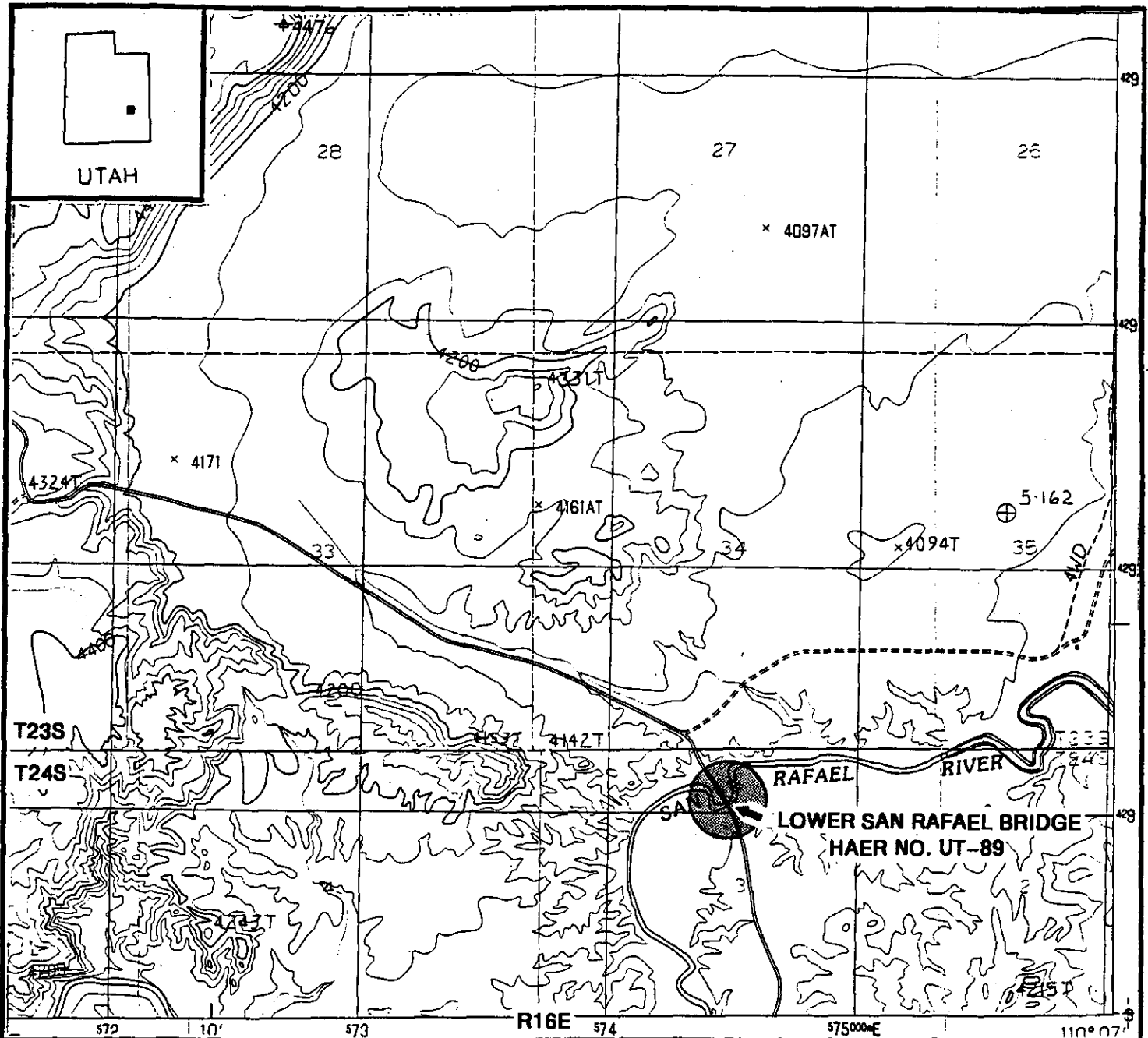
Michael Jensen, May 1996, Emery County Road Department. He was an original laborer on the bridge installation.

Robert Yourston, July 1996, World War II Engineer. Currently resides in Springville, Utah. He installed several Bailey Bridges in Okinawa during World War II.

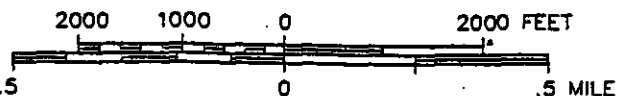
Lower San Rafael Bridge

HAER No. UT-89

Page 15



KEY:



LOWER SAN RAFAEL BRIDGE SPANNING SAN RAFAEL RIVER NEAR GREEN RIVER, UTAH

FIGURE 1

BRIDGE LOCATION

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environmental consultants, inc.

Salt Lake City, Utah Cedar City, Utah Reno, Nevada Elko, Nevada